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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech I Semester Supplementary Examinations, April 2023
Data Structures
(CSE & IT)

Roll No										

Time: 3 hours **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1		Explain Circular linked list and explain traversing, searching, insertion and deletion with sample code.	**[14M]**

OR

| 2 | | Explain singly linked list with an example. | **[14M]** |

SECTION-II

| 3 | A | What is Queue ADT and discuss its array implementation. | **[7M]** |
| | B | Explain Simple Queue and discuss its Linked list implementation. | **[7M]** |

OR

| 4 | A | Write a short note on Priority Queue and heaps. | **[4M]** |
| | B | Define Queue ADT and discuss its Linked list implementation. | **[10M]** |

SECTION-III

| 5 | A | Explain binary search methods with sample code. | **[7M]** |
| | B | Explain selection Sort and explain it with code. | **[7M]** |

OR

| 6 | A | Explain graph traversal techniques with an example. | **[7M]** |
| | B | Define merge Sort and explain it with code. | **[7M]** |

SECTION-IV

| 7 | | Discuss in detail about Dictionaries. | **[14M]** |

OR

| 8 | | Explain hashing and its representations. | **[14M]** |

SECTION-V

| 9 | A | Define AVL Tree? Explain various notations of AVL Tree | **[7M]** |
| | B | Explain about B-Tree and its operations with an example. | **[7M]** |

OR

| 10 | A | Discuss binary search tree with an example. | **[7M]** |
| | B | Differentiate between AVL Tree and B+ Tree | **[7M]** |

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech I Semester Supplementary Examinations, April 2023
Discrete Mathematics
(CSE & IT)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1 **A** Identify the converse, inverse and contra positive for the Proposition $P \rightarrow Q$ **[7M]**
   B Find DNF of $P \rightarrow ((P \rightarrow Q) \wedge \sim (\sim Q \vee \sim P))$ **[7M]**

OR

2 **A** Differentiate between PDNF and PCNF with two examples?   **[7M]**
   B Explain tautology, well-formed formulas and construct truth table for $P \rightarrow (Q \rightarrow R)$.   **[7M]**

SECTION-II

3 **A** Identify the given relation is equivalence relation or not?   **[7M]**
   A={ 1,2,3}, R={ (1,1), (1,2),(2,1), (2,2),(3,3),(3,2),(2,3)}
   B Construct the Hasse diagram for the divisibility relation   **[7M]**
   A= {3, 6, 12, 36, 72 }

OR

4 **A** Discuss properties of Lattice and give example of Lattice.   **[7M]**
   B Differentiate between equivalence relation and Hasse Diagram.   **[7M]**

SECTION-III

5 **A** If a, b are any two elements of a group (G, .) which commute, show that a^{-1} and b commute, b^{-1} and a commute, a^{-1} and b^{-1} commute Discuss about homomorphism and isomorphism of groups with an example.   **[7M]**
   B If a person having 4 trousers and 3 shirts, then identify the number of ways of selecting a pair?   **[7M]**

OR

6 **A** Define the following with suitable examples
   I.   Group   **[3M]**
   II. Monoid   **[3M]**
   B Express how many ways are there to distribute 10 apples and 10 mangoes to children who sat in a circular form. If mangoes and apples are distributed alternatively.   **[8M]**

SECTION-IV

7 **A** Solve the recurrence relation $a_n - 9a_{n-1} + 26a_{n-2} + 24a_{n-3} = 0$, $n \geq 3$, $a_0 = 0$, $a_1 = 1$, $a_2 = 10$.   **[7M]**
   B Solve the recurrence relation $a_n - 7a_{n-1} + 10a_{n-2} = 0$ $n \geq 2$, $a_0 = 10$, $a_1 = 41$.   **[7M]**

8   **A**   Solve the recurrence relation $a_{n+2} - a_{n+1} + a_{n=0}$ n>=0 where $a_0=0$, a1=1   **[7M]**

      B   . Solve the recurrence relation an $9a_{n-1}+26a_{n-2}+24a_{n-3}=0$ n>=3, a0=0, $a_1=1$,   **[7M]**
         $a_2=10$.

SECTION-V

9   **A**   Discuss Trees, spanning trees and minimal spanning trees with illustration.   **[7M]**

      B   Compare between Euler graphs and Hamiltonian graphs with appropriate   **[7M]**
         example.

10   **A**   Describe about planar graphs, graph coloring, digraphs, directed acyclic   **[7M]**
         graphs

      B   Explain about weighted digraphs, region graph and chromatic numbers.   **[7M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech I Semester Supplementary Examinations, April 2023
Operating Systems
(CSE & IT)

Roll No									

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.
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SECTION-I

1	A	Explain operating systems services and system components	**[7M]**
	B	Briefly discuss about Case study on UNIX and WINDOWS Operating System.	**[7M]**

OR

2	A	Explain with a neat example how system calls used.	**[7M]**
	B	What is multiprogramming? Explain multi programmed Systems	**[7M]**

SECTION-II

3	A	What is process control block? Explain all the blocks with example	**[8M]**
	B	Differentiate Pre-emptive and non pre-emptive scheduling algorithm with example	**[6M]**

OR

4	A	Explain Cooperating Processes with example	**[6M]**
	B	Assume the following workload in a system:	**[8M]**

Process   Arrival Time   Burst Time
P1   2   6
P2   1   8
P3   0   3
Draw a Gantt chart illustrating the execution of these jobs using SJF scheduling algorithm and also Calculate the average waiting time and average turnaround time.

SECTION-III

5	A	Explain necessary conditions for handling deadlocks?	**[7M]**
	B	Explain Banker's algorithm to avoidance of dead lock .	**[7M]**

OR

6	A	What is monitor? Explain Bounded buffer problem with monitor	**[7M]**
	B	What is semaphore? Explain Dining philosopher problem using semaphore	**[7M]**

SECTION-IV

7	A	State and explain four approaches to free space management.	**[7M]**
	B	What is Semaphore? Explain bounded buffer problem using semaphore	**[7M]**

OR

8	A	Consider page reference string 1, 3, 0, 3, 5, 6, 3 with 3 page frames. Find the number of page faults using FIFO.	**[7M]**
	B	Explain Demanding paging with example.	**[7M]**

9	A	Explain SCAN and C-SCAN disk scheduling algorithm.	**[7M]**
	B	Consider the following disk request sequence for a disk with 100 tracks 45, 21, 67, 90, 4, 50, 89, 52, 61, 87, 25	**[7M]**
		Head pointer starting at 50 and moving in left direction. Find the number of head movements in cylinders using FCFS scheduling.	

OR

10	A	Explain file access methods with example	**[7M]**
	B	Explain about deadlock avoidance.	**[7M]**

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech I Semester Supplementary Examinations, April 2023
Analog and Digital Electronics
(CSE & IT)

| Roll No									

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1   **A**   Examine V-I Characteristics of Ge-Diode and Si-Diode with Forward Bias and Reverse Bias   **[7M]**

    B   A Ge diode carries a current of 10mA when it is forward biased with 0.2v at 27 c i)Find the reverse saturation current ii)Find the bias voltage required to get a curent of 100mA   **[7M]**

OR

2   **A**   What is diode equivalent circuit and explain different models of diode equivalent circuit   **[7M]**

    B   Assuming the diodes in the circuit are ideal.Find the labelled voltages and currents   **[7M]**
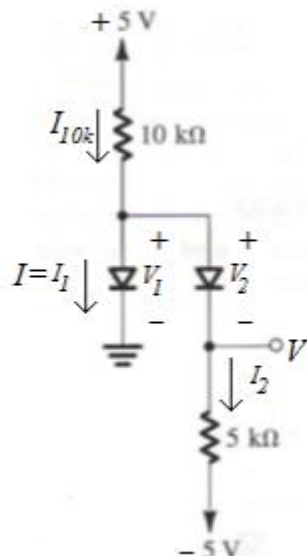
SECTION-II

3   **A**   Explain the operation of CE Configuration of BJT and its input and output characteristics briefly.   **[7M]**

    B   For a silicon, $\alpha=0.995$ emitter current is 10mA & leakage current IC0=0.5µA.   **[7M]**

Find I_C, I_B, β, and I_{CEO}

<div align="center">OR</div>

| 4 | A | Draw the input & output characteristics of a NPN transistors in CB configuration & explain | [7M] |
| | B | Determine the common base dc current gain. in a common base connection, the emitter current is IE is 6.28 mA and the collector current IC is 6.20 mA. | [7M] |

<div align="center">**SECTION-III**</div>

| 5 | A | Convert the given expression in standard SOP form f(A,B,C)=AC+BA+BC | [7M] |
| | B | Convert the given expression in standard POS form y=A.(A+B+C) | [7M] |

<div align="center">OR</div>

| 6 | A | What are universal gates?Realize basic gates using universal gates | [7M] |
| | B | What is the difference between canonical form and standard form? Explain | [7M] |

<div align="center">**SECTION-IV**</div>

| 7 | A | Reduce the following function using k-map technique F(A,B,C,D)=π(0,2,3,8,9,12,13,15) | [7M] |
| | B | Minimize the expression using k-map y=(A+B+C') (A+ B+C) (A' + B' + C') (A'+ B +C) (A+B+C) | [7M] |

<div align="center">OR</div>

8		Simplify the following Boolean expressions using K-map and implement it by using NOR gates.	
		a) F(A,B,C,D)=AB'C' +AC+A'CD'	[7M]
		b) F(W,X,Y,Z)=w' x'y'z' + wxy'z' + w'x'yz+wxyz	[7M]

<div align="center">**SECTION-V**</div>

| 9 | A | Draw the logic diagram of a SR latch using NOR gates. Explain its Operation using excitation table. | [7M] |
| | B | Convert D flip-flop into T and JK flip-flops. | [7M] |

<div align="center">OR</div>

| 10 | A | Design a combinational logic circuit for a 2-bit magnitude comparator. | [7M] |
| | B | Design a Octal to binary encoder with logic gates. | [7M] |

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
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II B.Tech I Semester Supplementary Examinations, April 2023
Computer Organization
(CSE)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION-I

1	A	Explain about Error detection and correction codes in Computer Arithmetic.	[7M]
	B	Explain Booth multiplication algorithm with flowchart.	[7M]

OR

2	A	Discuss about Data Representation and its types in detail.	[7M]
	B	Describe about Software, Performance, Multiprocessors and Multicomputer in Basic Functional units of Computers	[7M]

SECTION-II

3	A	Write in detail about Arithmetic micro operations.	[7M]
	B	Describe Types of Instructions in Basic Computer Organization and Design.	[7M]

OR

4	A	Explain the following	
		I. Types of Registers	[3M]
		II. Bus and memory transfers.	[4M]
	B	Explain about Instruction cycle in Basic Computer Organization and Design.	[7M]

SECTION-III

5	A	Write about Control memory and Address sequencing in Control unit design.	[7M]
	B	Differentiate between CISC and RISC processors.	[7M]

OR

6	A	Explain about General Register Organization and Stack organization.	[7M]
	B	Explain in detail about various addressing modes with numerical examples.	[7M]

SECTION-IV

7	A	Briefly explain about Semiconductor memory technologies, hierarchy.	[7M]
	B	Write a short note on RAM and ROM chips with its internal organizations.	[7M]

OR

8	A	Write about Cache memory and mapping techniques in cache memory.	[7M]
	B	Discuss about page Replacement algorithms, write policies and Magnetic tapes.	[7M]

SECTION-V

9	A	Describe about Instruction level Parallelism with example.	[7M]
	B	Explain about Peripheral devices, Input-output subsystems and I/O device interface.	[7M]

OR

10	A	Explain about I/O Processor, I/O transfers–Program controlled .	[7M]
	B	Discuss about DMA transfer with neat sketch.	[7M]

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MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous Institution – UGC, Govt. of India)
II B.Tech I Semester Supplementary Examinations, April 2023
Probability and Statistics
(CSE & IT)

Roll No										

Time: 3 hours   **Max. Marks: 70**

Note: This question paper Consists of 5 Sections. Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 14 marks.

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SECTION I

1.A) A coin is tossed three times. If X is a random variable giving the no.of heads that arise, construct a table showing the probability distribution of X.   **7M**

B) Define probability & explain following with examples i) equally likely events ii) mutually exclusive events iii) independent events iv) sample space   **7M**

OR

2.A) Two boxes are selected at random. The first box contains 2 white balls & 3 black balls. The second box contains 3 white & 4 black balls.What is the probability of drawing a white ball?   **7M**

B) Define random variable& consider random variable X with probability density function

$$f(x) = \begin{cases} 4x^3, if\ o < x < 1 \\ 0 \quad otherwise \end{cases}$$

Find mean and variance.   **7M**

SECTION II

3.A) Define Poisson distribution & find its mean and variance.   **7M**

B) Define i)Probability ii) Probability distribution iii) types of probability distribution.   **7M**

OR

4.A) Find Moment generating function of binomial distribution   **7M**

B) The weights of bags of red gravel may be modelled by normal distribution with mean 25.8kg and S.D 0.5kg. Determine the probability that a randomly selected bag of red gravel will weight i) less than 25kg ii) between 25.5kg &26.5kg.   **7M**

SECTION III

5.A) The marks obtained by 10 students in mathematics & statistics are given below.Find the rank correlation coefficient between two subjects.

Mathematics	25	28	30	32	35	36	38	42	45	39
Statistics	20	26	29	30	25	18	26	35	46	35

7M

B) What are the types of correlation and Find correlation coefficient if $b_{xy} = 0.85, b_{yx} = 0.89$ **7M**

OR

6.A) The equation of two regression lines are $7x - 16y + 9 = 0$ & $5y - 4x - 3 = 0$ Find the correlation coefficient and the means of x & y. **7M**

B) Fit the curve $y = a + bx + cx^2$ for the following data & also estimate y(2.4) for the following data.

X	1	2	3	4
Y	1.7	1.8	2.3	3.2

7M

SECTION-IV

7.A) Explain about i) Parameter & Statistic ii)Type I & Type II errors **7M**

B) Explain about i) Critical region ii) Maximum error. **7M**

OR

8.A)Explain the procedure for Testing of Hypothesis **7M**

B) A random sample of 500 pineapples was taken from a large consignment and 65 were found to be bad. Show that the S.E. of the proportion of bad ones in a sample of this size is 0.015 and deduce that the percentage of bad pineapples in the consignment almost certainly lies between 8.5 and 17.5. **7M**

SECTION V

9.A) In a sample of 1000 people in a state,540 are rice eaters &the rest are wheat eaters, Can we assume that both rice & wheat eaters are equally popular in this state at 1% level of significance. (table value=2.58) **7M**

B) The following is the distribution of the daily number of power failures reported in a city

No.of power failures	0	1	2	3	4	5	6	7	8	9
No.of days	9	43	64	62	42	36	22	14	6	2

Test the goodness of fit of poisson distribution at 5% level of significance **7M**

OR

10.A) A sample of 900 members is found to have a mean of 3.4cm. Can it be reasonably regarded as truly random sample from population with mean 3.25cm & S.D 1.61cm. **7M**

B.) A random sample of 16 has 53 as mean & sum of the squares of the deviations taken from mean is 150. Can this sample be regarded as taken from the population having 56 as mean. Obtain 95% & 99% confidence limits of the mean of the population. **7M**

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